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## Physiological Responses and Adaptations to Resistance Exercise

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# Introduction to the symposium: physiological responses and adaptations to resistance exercise

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### ABSTRACT

VOGEL, J. A. Introduction to the symposium: physiological responses and adaptations to resistance exercise. *Med. Sci. Sports Exerc.*, Vol. 20, No. 5 (Supplement), p. S131, 1988. This symposium reviews our current knowledge of resistance exercise. Resistance exercise is defined as high intensity training with repetitions as used for strength and power development. The symposium examines each major involved system: muscle, nerve, cardiovascular, endocrine, bioenergetics, bone, and connective tissue.

STRENGTH, MUSCLE POWER, TRAINING, PHYSIOLOGY

Resistance exercise is becoming widely used and accepted, not only in sports training but also in recreational and health related exercise as well as occupationally related training. Highly specialized and sophisticated resistance programs are part of most athletic training programs today. The inclusion of resistance exercise equipment for recreational lifters and in various types of physical and cardiac rehabilitation programs is widespread. Occupational applications may be the fastest growing area. Better resistance training programs are needed to prepare law enforcement, firefighters, and military personnel to enhance their capacity for repetitive strength demanding tasks. Aviators of high performance aircraft are now beginning to use resistance exercises to improve their gravitational tolerance.

Our understanding of the physiology of resistance exercise may not be keeping up with this rapid expansion. When one examines the few existing written reviews on the subject, one is impressed with the emphasis

on the topics of technique, prescriptions, and measurement, with comparatively little on the physiological processes and adaptive mechanisms associated with this type of exercise. A better understanding is needed of the impact that different exercise prescription variables (i.e., set, load, volume) have on physiological responses and adaptation. This symposium was organized toward this end by examining each major involved system: muscle, nerve, cardiovascular, endocrine, bioenergetics, bone, and connective tissue. Each of the six following articles reviews our knowledge and points out gaps and needed research in one of these areas.

It should be noted that we have chosen to use the term "resistance", rather than "strength" or "weight". The term "strength" omits other targeted goals, such as power development or muscle hypertrophy. The term "weight", on the other hand, does not include the many devices that are in use beyond free weights themselves. Thus, it is suggested that resistance exercise is a suitable term to cover all modes of training whether they be free weights, isokinetic, variable resistance, or isometrics. This symposium and the review papers which follow are concerned specifically with heavy resistance exercise, that is, high intensity with few repetitions, as used for strength and power development. A-1121

The views, opinions, and/or findings contained in this report are those of the author and should not be construed as any official Department of the Army position, policy, or decision unless so designated by other official documentation.

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